

WHAT IS CLAIMED IS:

1. A manipulator comprising:

a manipulation target object manipulating member
being driven and controlled by a plurality of free
5 rotation axes;

all the plurality of free rotation axes crossing
at one point; and

a manipulation distal end portion of said
manipulating member being placed near the intersection.

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2. The manipulator according to claim 1, wherein
said manipulating member is integrally mounted on a
spherical shell movable member, the manipulation distal
end portion of said manipulating member is placed near
15 the center of the spherical shell movable member, the
spherical shell movable member is in contact with a
vibration member which can vibrate, and rotation of the
spherical shell movable member around the center
thereof is controlled by controlling vibration of the
20 vibration member, thereby controlling a posture of said
manipulating member.

3. The manipulator according to claim 1, further
comprising:

25 first rotating means for rotating a first
rotating shaft on which a first arm is mounted;
second rotating means for rotating a second

rotating shaft which is mounted on the first arm and on which a second arm is mounted; and

third rotating means for rotating a third rotating shaft which is mounted on the second arm and
5 on which a third arm is mounted,

wherein said manipulating member is mounted on the third rotating shaft, and said first, second, and third rotating shafts pass through a manipulation distal end portion of said manipulating member.

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4. A minute object manipulating apparatus comprising:

a manipulator comprising a manipulation target object manipulating member being driven and controlled
15 by a plurality of free rotation axes, all the plurality of free rotation axes crossing at one point, and a manipulation distal end portion of said manipulating member being placed near the intersection;

a magnifying observation device for magnifying
20 observation of the manipulation target object and the manipulation distal end portion of said manipulating member; and

a remote controller for remotely controlling said manipulator.

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5. The apparatus according to claim 4, wherein said manipulator is placed on an upper side of the

manipulation target object, and said magnifying observation device is placed on a lower side of the manipulation target object.